REMARKS

Claims 2-3 are pending in the present application. Claim 2 has been amended. Support for the amendment to claim 2 can be found in the present specification at page 4, lines 6-7. Thus, no new matter has been added.

Based upon the above considerations, entry of the present amendment is respectfully requested.

In view of the following remarks, Applicant respectfully requests the Examiner to withdraw all rejections and allow the currently pending claims.

Issues Under 35 U.S.C. § 103(a)

Claims 2-3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takada (JP 10-329515, newly cited; hereinafter Takada '515) in view of Majumdar (U.S. Patent No. 5,503,940; hereinafter Majumdar '940), Matsui (JP 9-302149, newly cited; hereinafter Matsui '149) and Carter (U.S. Patent No. 5,807,918, newly cited; hereinafter Carter '918). The U.S. equivalent of Takada '515 is U.S. Patent No. 6,073,669 (hereinafter Takada '669). Applicant respectfully traverses.

Applicant's previous arguments for patentability presented in the Amendment and Reply Under 37 C.F.R. § 1.111 dated August 13, 2002, have been rendered moot. The previous rejections have been withdrawn (as stated in the Office Action at page 4).

The Present Invention and Its Advantages

The bead portion of a tire is in direct contact with the rim, and a chafer is often provided to prevent exposure of a tire reinforcing element due to abrasion of the bead portion (as discussed in Applicant's specification at page 1). A chafer can also strengthen the engagement between the tire and rim. In the case of a tubeless tire, the chafer maintains a constant internal air pressure. Chafers for heavy duty pneumatic tires undergo repeated severe deformation upon usage and highly exothermic conditions due to high internal pressure and heavy loads.

The present invention solved the problems typically associated with a chafer, such as rim-slippage, creep, and toe-cracking (see pages 1-2 of the present specification for discussion of Rim-Slippage Resistance, Creep Resistance, and Toe-Cracking Resistance; see also page 3, lines 19-23), without compromises in the tensile strength and elongation.

More specifically, the present invention is directed to a chafer rubber composition (or a heavy duty pneumatic tire comprising the chafer rubber composition in the bead portion). For the novel chafer rubber composition, 55-75 parts by weight of carbon black (having a nitrogen adsorption specific surface area of 70-120 m^2/g) and 0.2-0.5 parts by weight of 1,3-bis(citraconimidomethyl)benzene are blended with 100 parts by weight of a rubber component containing 30-50 parts by weight of natural rubber and/or polyisoprene rubber and 50-70

parts by weight of polybutadiene rubber which has a syndiotactic crystal content of at least 5% by weight. Further, the ratio S/A of a blended amount of sulfur S and a blended amount of vulcanization accelerator A is in a range between 0.25 and 0.5.

Even the advantages of the present invention have been experimentally confirmed (see Table 3 on page 8 of the present invention; see Table 4 on page 9 for Comparative Examples; see also page 11, line 15 to page 12, line 4 for a discussion of these results).

For instance, the tested heavy duty pneumatic tires have unexpectedly achieved better resistance to abrasion (due to friction between the chafer and the rim sheet or rim flange), improved resistance to creep (due to the chafer receiving strong compressive stress from the rim flange and bead sheet), and better resistance to local deformation of the chafer toe portion.

Further, because the ratio S/A of a blended amount of sulfur S and a blended amount of vulcanization accelerator A is in a range between 0.25 and 0.5, the tested heavy pneumatic tires achieve the required strength without degradation in thermostability. See Examples 7-11 in Table 3, wherein the respective S/A ratios are: 0.66 (Ex. 7); 0.5 (Ex. 8); 0.33 (Ex. 9); 0.25 (Ex. 10); and <0.25 (Ex. 11); see also page 5, lines 17-26 for a discussion on what happens when the S/A ratio falls outside the range of 0.25-0.5.

In other words, the present invention has achieved unexpected results in all three desirables areas of Rim-Slippage Resistance, Creep Resistance, and Toe-Cracking Resistance. Such good results leads to better durability of the bead portion, and in the case of a tubeless tire, good air-tightness to maintain the internal pressure.

In contrast, the combination of Takada '515, Majumdar '940, Matsui '149, and Carter '918 fails to disclose all features and advantages as instantly claimed.

Distinctions over the Combination of Takada '515, Majumdar '940, Matsui '149, and Carter '918

(A) Lack of Disclosure in the Cited Combination of References

Takada '515 discloses a heavy duty pneumatic tire having a pair of bead portions (see Abstract of Takada '669), wherein the Office Action appears to refer to Table I at Col. 4 of Takada '669.

However, Takada '515 fails to disclose 1, 3-bis (citraconimidomethyl) benzene, an amount between 0.2 and 0.5 phr thereof, and as well as the nitrogen adsorption specific surface area of the carbon black as instantly claimed (see the Office Action at page 2). Takada '515 also lacks disclosure in that Takada '515 does not describe a polybutadiene rubber that has a syndiotactic crystal content of at least 5% by weight

Majumdar '940 is used to disclose uses of bis-imide compounds at a certain amount, including BCl; Matsui '149 and Carter '918 are referred to for disclosing BET surface area (pages 2-3 of the Office Action). However, these secondary references still do not account for the deficient disclosure of Takada '515, whereby none of these reference describe a polybutadiene rubber that has a syndiotactic crystal content of at least 5% by weight

Thus, Applicant respectfully submits that a *prima facie* case of obviousness has not been formed with respect to the asserted combination of Takada '515 in view of Majumdar '940, Matsui '149, and Carter '918, because not all requirements for a *prima facie* case of obviousness have been satisfied.

U.S. case law squarely holds that a proper obviousness inquiry requires consideration of three factors:

- the prior art reference (or references when combined) must teach or suggest all the claim limitations;
- whether or not the prior art would have taught, motivated, or suggested to those of ordinary skill in the art that they should make the claimed invention (or practice the invention in case of a claimed method or process); and
- whether the prior art establishes that in making the claimed invention (or practicing the invention in case of a claimed

method or process), there would have been a reasonable expectation of success.

See In re Vaeck, 947 F.2d, 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991); *see also In re Kotzab*, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000); *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988). Here, the cited primary reference of Takada '515 fails to disclose all features of the present invention (the first requirement for a *prima facie* case of obviousness), and none of the other cited references account for these deficiencies of Takada '515.

As mentioned, the Examiner refers Applicant to Table 1 of Takada '515, and the other secondary references are referred to in order to account for the deficient disclosure of Takada '515. However, none of the cited references, in any combination, account for all deficiencies of Takada '515. For example, none of these secondary references disclose 50-70 parts by weight of a polybutadiene rubber that has a syndiotactic crystal content of at least 5% by weight or that this rubber having the syndiotactic crystal content is blended with the other claimed components. The same deficiency is true of the primary reference, Takada '515.

Thus, the asserted combination of Takada '515, Majumdar '940, Matsui '149, and Carter '918 does not satisfy the initial requirement for a *prima facie* case of obviousness (disclosure of all claimed features). Thus, Applicant submits that this rejection is instantly overcome.

(B) Other Distinctions and Improper Combination of the References

Applicant further submits that to pick and choose these references in order to achieve the present invention can only be accomplished by reading the present specification, reviewing what is being claimed, and then applying substantial hindsight reconstruction by combining reference A, reference B and reference C. However, this reconstruction is contrary to case law when the USPTO has simply chosen elements from cited references after considering the instant disclosure to order to come up with the components as presently claimed (*i.e.*, claim 2 or 3). The USPTO has, therefore, relied on an impermissible level of hindsight reconstruction as a basis of support of the instant rejection.

In addition to the above reasons of distinction, one having ordinary skill in the art would not be motivated or reasonably expect to be successful in combining Takada '515 with the other cited references in order to achieve the present invention.

There are three possible sources of motivation to combine references: the nature of the problem to be solved, the teaching of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet,* 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998). However, one skilled in the art would not be motivated in combining the cited references due to the inconsistent features between the cited references. For instance, the Office Action refers to the components in Table 1 for the described chafer

composition (*i.e.*, 40 phr of natural rubber). However, the chafer composition of Takada '515 (or Takada '669, at Col. 4) requires the additional ingredients of 4 phr of age resistor, 2 phr of stearic acid, and 3 phr of hydrozincite. These required components of Takada '515 are not disclosed in Majumdar '940. Further, the Majumdar '940 reference discloses an elastomeric adhesive composition having a bis-imide compound, one or more elastomers, and a tackifier. There is no stearic acid/hydrozincite/age resistor combination in Majumdar '940, and no tackifying agent in Takada '515.

The described features are inconsistent between the cited references, and one having ordinary skill in the art would not be motivated, or reasonably expect to be successful, in combining Takada '515, Majumdar '940, Matsui '149, and Carter '918.

Thus, the other requirements for a *prima facie* case of obviousness have not been satisfied as well. Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Unexpected Results Rebut a *Prima Facie* Case of Obviousness

Applicant further submits that the existence of unexpected results rebuts any asserted *prima facie* case of obviousness. As mentioned, the present invention has achieved the unexpected results of improving all three of Rim-Slippage Resistance, Creep Resistance, and Toe-Cracking Resistance. Further, because the ratio S/A of a

blended amount of sulfur S and a blended amount of vulcanization accelerator A is in a range between 0.25 and 0.5, the present invention has produced a chafer rubber composition leading to the required strength without degradation in thermostability in a heavy duty pneumatic tire (see Examples 7-11 in Table 3 having certain S/A ratios; see also page 5, lines 17-26).

However, none of these advantages (nor all features as claimed) are disclosed in the cited references. Applicant has shown that the claimed S/A ratio of 0.25 to 0.5 leads to many desirable characteristics, such as improvements in strength at break, elongation at break, hardness and loss tangent, without the chafing or cracking in the tire (see results of Table 3). None of the cited references even disclose advantages such as better Rim-Slippage Resistance, Creep Resistance, and Toe-Cracking Resistance.

The reference to the experimental results of claim 3 in the Office Action (at page 5) is assuming that the cited combination of references is proper, wherein Applicant submits that the cited combination of references is not proper (for the above-mentioned reasons).

In addition, Applicants respectfully refer the Examiner to page 11, lines 15-19 of the specification, wherein Applicant discloses that the Comparative Examples and Examples show that the 1,3-bis(citraconimidomethyl) benzene does improve tensile properties after aging. Even Comparative Example 2 (using 0.1 parts by weight

of 1,3-bis(citraconimidomethyl) benzene) has better mechanical properties over Comparative Example 1 (no amount used), as well as Example 1 (using 0.2 parts by weight) showing better results over Comparative Example 2 (0.1 parts by weight; see the results of the strength at break after aging).

There is no improvement in tensile properties after aging that is observed when the blended amount exceeds 0.5 parts by weight. Applicant has discovered that exceeding 0.5 parts by weight leads to a saturated state of the 1,3-bis(citraconimidomethyl) benzene, which has undesirable, economic disadvantages (see page 5, lines 10-13 of the specification), where such drawbacks would not be shown in Table 3 or 4 of the specification. Thus, there does exist unexpected results for the present invention.

Applicants also submit that there are other features of the present invention, and respectfully request the Examiner to view all unexpected results as disclosed in the specification.

Further, Applicant submits that these unexpected experimental results do apply to the embodiment of claim 2 because the claimed chafer rubber composition does not have to be shown to be useful in many ways to show the patentability of the invention. *See In re Chupp*, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987). Specifically, the Federal Circuit stated:

> *Papesch* held that a compound can be patented on the basis of its properties; *it did not hold that those properties must produce superior results in every environment in which the compound may*

> *be used.* To be patentable, a compound need not excel over prior art compounds in all common properties. Evidence that a compound is unexpectedly superior in one of a spectrum of common properties, as here, can be enough to rebut a *prima facie* case of obviousness.

(Emphasis added; Federal Circuit citing *In re Papesch*, 315 F.2d 381, 137 USPQ 43 (CCPA 1963), *United States* v. *Ciba-Geigy Corp.*, 508 F.Supp. 1157, 1169, 211 USPQ 529, 535-36 (D.N.J. 1979), and *In re Ackermann*, 444 F.2d 1172, 1176, 170 USPQ 340, 343 (CCPA 1971).

The scope of patentability of claim 2 is not required to coincide with the demonstration of unexpected results based on many or several uses of the chafer rubber composition. Thus, Applicant respectfully requests the Examiner to reconsider the unexpected results in view of both claims 2 and 3.

Therefore, Applicant respectfully submits that the present invention has unexpectedly achieved results that rebut the asserted combination of references.

Conclusion

Accordingly, Applicant respectfully submits that the present invention incorporates subject matter that is patentably distinguishable from the asserted combination of the four references. This is because the cited combination of Takada '515, Majumdar '940, Matsui '149, and Carter '918 fails to disclose all features as instantly claimed. Further, the references have been improperly combined due to inconsistent features between the cited references.

Thus, all requirements for a *prima facie* case of obviousness have not been satisfied. In addition, unexpected results do exist for the present invention, which rebut any asserted *prima facie* case of obviousness based on Takada '515, Majumdar '940, Matsui '149, and Carter '918.

Therefore, Applicant respectfully requests that the Examiner reconsider, and to withdraw all rejections and allow the currently pending claims.

A full and complete response has been made to all issues as cited in the Office Action. Thus, Applicant respectfully requests that the Examiner pass the application to issue.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Eugene T. Perez (Reg. No. 48,501) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

Pursuant to 37 C.F.R. § 1.17 and 1.136(a), Applicants respectfully petition a one (1) month extension of time for filing a response in connection with the present application. The required fee of $110.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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0033-0693P

Attachment: Version with Markings to Show Changes Made

(Rev. 02/20/02)

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims have been amended as follows:

2. (Twice Amended) A chafer rubber composition, wherein 55-75 parts by weight of carbon black having a nitrogen adsorption specific surface area of 70-120 m^2/g and 0.2-0.5 parts by weight of 1, 3-bis (citraconimidomethyl) benzene are blended with respect to 100 parts by weight of a rubber component including 30-50 parts by weight of natural rubber and/or polyisoprene rubber and 50-70 parts by weight of polybutadiene [rubber,] rubber which has a syndiotactic crystal content of at least 5% by weight, wherein a ratio S/A of a blended amount of sulfur S and a blended amount of vulcanization accelerator A is in a range between 0.25 and 0.5.